

AMENDMENTS TO THE DRAWINGS

The drawing originally numbered as Figure 1 is amended to renumber each of its four parts as Figures 1a-1d, respectively.

Attachments: Replacement Sheet

REMARKS

Claims 1-5 are pending in the application.

By the foregoing Amendment, claims 1-5 are amended. Claims 1 and 5 are amended to more precisely define the structure of the openings; and claim 5 also is amended to more precisely define the steps of the method. Claims 2-4 are amended for better conformity with U.S. practice. The drawings are amended to renumber the four parts of Figure 1 as Figures 1a-1d, respectively. The specification is amended to add the heading for the "BRIEF DESCRIPTION OF THE DRAWINGS" and the heading and text of the "DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS"; to add a reference to Figure 1 in the "DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS"; to correct the location of the heading for the "BRIEF SUMMARY OF THE INVENTION"; and to add the heading and text for the "CROSS-REFERENCE TO RELATED APPLICATIONS."

These changes are believed not to introduce new matter, and entry of the Amendment is respectfully requested.

Based on the above Amendment and the following Remarks, Applicant respectfully requests that the Examiner reconsider all outstanding objections and rejections, and withdraw them.

National Stage Information

In paragraph 3 of the Office Action, the application was stated to be the U.S. national phase of international application PCT/JP03/11956, claiming benefit of JP 2002-290448. This information is in error. PAIR correctly reflects that his application is the U.S. national phase of international application PCT/EP04/05061, claiming priority from DE 103 23 923.5.

Objection to the Specification under 35 U.S.C. § 112, ¶ 1

In paragraphs 5 and 6, the specification was objected to as omitting the heading for the “BRIEF DESCRIPTION OF THE DRAWINGS” and the heading and text of the “DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS”; and for not discussing Figure 1. These objections are believed to be overcome by the amendments made to the specification in the second substitute specification submitted herewith.

Rejections under 35 U.S.C. § 103

In paragraph 10 of the Office Action, claims 1-5 were rejected under section 103(a) as being unpatentable over Bagby in view of Lee et al. This rejection is believed to be overcome by the above amendments to claims 1 and 5.

Amended claims 1 and 5 recite that the pinhole comprises first and second silicon apertures, each one having a rectangular opening having flanks etched at an acute angle, the openings being arranged with the flanks thereof mirror-inverted relative to a mirror plane between the first and second apertures. These features of the invention enable the pinhole opening to be set to a wide range of sizes from micrometers to millimeters, due to the atomic accuracy of the silicon openings.

Neither Bagby nor Lee et al. teaches or suggests apertures having openings having flanks etched at an acute angle. Thus the combination of Bagby and Lee et al. cannot teach or suggest this feature of the invention. Further, it is impossible with the mechanics of Bagby’s pinholes to set the pinhole opening to a wide range of sizes from micrometers to millimeters.

It is further respectfully submitted that the teachings of Lee et al. are incompatible with those of Bagby; and thus that Lee et al. cannot properly be combined with Bagby. Lee et al.'s disclosure is directed to "microfabricating" and "micromachining" of optical elements in "on-chip benchtop optics." This means the size of the pinhole arrangement suggested by Lee et al. is in the magnitude of micrometers (μm), whereas a pinhole for laser scanning microscopes has to be at least in the magnitude of millimeters (mm) to provide an opening up to 1 mm^2 and larger.* It is impossible to fabricate pinholes of this size using Lee et al.'s on-chip micromachining techniques. Therefore, Lee's teachings cannot be applied to Bagby's pinholes; and a person of ordinary skill in the art would not be taught by Lee et al. to make Bagby's adjustable pinhole from silicon, nor to use such a pinhole in a laser scanning microscope.

With respect to claim 5, it is further noted that Bagby only describes the mandatory circumstance that the resulting pinhole opening is maximal if the openings of both apertures are coincident (see Bagby, col. 3, lines 52-55). In contrast claim 5 provides a method for finding a square shape setting of the pinhole.

In view of the foregoing, it is respectfully submitted that the invention as recited in claims 1-5 is patentable over Bagby in view of Lee et al.; and that the rejection should be withdrawn.

* See, for example, paragraph 6 of the second substitute specification, which states:

An object of the present invention is to realize an adjustable pinhole, which enables apertures with sizes greater than $3\mu\text{m}$ in a field of $1\times 1\text{mm}^2$ with the tolerance of $0.3\mu\text{m}$. Thereby, it is important to keep the physical dimensions of the aperture in the direction of the light flux as small as possible, for example smaller than $10\mu\text{m}$, in order to avoid the vignetting of the light passing through the aperture.

Conclusion

All objections and rejections have been complied with, properly traversed, or rendered moot. Thus, it now appears that the application is in condition for allowance. Should any questions arise, the Examiner is invited to call the undersigned representative so that this case may receive an early Notice of Allowance.

Favorable consideration and allowance are earnestly solicited.

Respectfully submitted,

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Attachments: **Substitute specification (clean and marked-up)**
 Replacement drawing sheets (2)
 Petition for extension of time -- Three months
 Credit card payment form